

## ALPHANUMERIC FORECAST MATRIX (RDF)

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**NOTICE:** This publication is available at: <http://www.nws.noaa.gov/XXXX>.

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### Part I - Mission Connection

The Alphanumeric Forecast Matrix (RDF) displays various forecasted weather parameters in 3-hour, 6-hour, and 12-hour intervals. These intervals combined within a matrix format create a detailed forecast, allowing quick review of forecast parameters. The RDF provides a maximum resolution of 3-hourly detailed weather parameters up to 60 hours into the future. An extended portion of the RDF provides 6-hourly forecasts seven days into the future.

NWS is providing information in the RDF to the public, as supplemental detail beyond that within other standard NWS products (e.g., Zone Forecast Product). All forecast parameters are currently included in other standard NWS public products. The level of detail in the RDF is consistent with current forecast skill, but is beyond that which can easily be communicated in other products.

Using advances in computer capabilities, as well as scientific advances to create customer-based products and services, the NWS, through the RDF, strives toward the following goals:

- improve communications to the public and Hazards community
- increase forecast resolution
- provide customers the information they need to base their decisions on
- increase forecast and warning accessibility by all customers.

The RDF is intended for use by large volume users of NWS forecast information and for use by the general public. The quasi-static matrix format of the RDF allows for rapid visual scanning of a large number of forecast parameters/values. In addition, the forecast data is decodable by computers for those who wish to create derived products, until such alphanumeric data is made available by NWS in other formats.

### Comments

We are always seeking to improve our products based on user feedback. Comments on the RDF product may be addressed to:

National Weather Service Headquarters  
1325 E-W Highway, SSMC2  
Silver Spring, MD 20910  
ATTN: OS22/RDF  
e-mail: [Douglas.Young@noaa.gov](mailto:Douglas.Young@noaa.gov)

# NWS PDD - ALPHANUMERIC FORECAST MATRIX - February 14, 2002

## Part II - Technical Description

### Exhibit 1. Alphanumeric Forecast Matrix (RDF) Product Example

FOUS## KNNN DDHHMM	(WMO Header)														
RDFNNN	(AWIPS ID)														
ALPHANUMERIC FORECAST MATRIX [FOR LOCATION*]	(MND - NWS Product Name)														
NATIONAL WEATHER SERVICE CITY STATE	(Issuing Office)														
400 AM EST MON FEB 12 2001	(Issuance Time/Date)														
SSZ###-###>###-DDHHMM-	(UGC Type: <u>Zone</u> )														
COUNTY ST-COUNTY ST-COUNTY ST	(Included County/State if														
necessary) /NEW.CCCC.HW.A.####.0102T131900Z-0102T132200Z/	(VTEC code)														
...HIGH WIND WATCH UNTIL 5 PM EST...	(Headline if applicable)														
	MON 02/12/01					TUE 02/13/01					WED 02/14/01				
EST 3HRLY	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21
POP 12HR						20			10			20			70
QPF 12HR						0			0			.25-	.49		.10-.24
MAX QPF						0			0			.25-	.49		.10-.24
SNOW 12HR						00-00			00-00			00-00			
MX/MN/RNG				47	49	51		36	38	39		55	56	60	46
TEMP	33	39	45	46	45	43	41	39	41	45	49	50	49	49	50
DEWPT	15	17	20	22	25	29	33	34	36	38	40	42	42	43	44
RH 3HR	47	40	37	38	45	57	73	82	82	76	71	74	77	80	80
WIND DIR	NW	NW	W	W	SW	SW	W	W	S	S	S	S	S	SW	SW
WIND SPD	5	8	8	8	8	8	5	2	9	14	28	36	26	22	10
CLOUDS 3HR	OV	OV	OV	OV	BK	BK	SC	BK	BK	BK	BK	BK	OV	OV	OV
RAIN															L
RAIN SHWRS						C	C								L
OBVIS		K	K									F	F	F	F
WIND CHILL	30	30													
MIN CHILL 6HR						24									
HIGH WIND										A	A				
	THU 02/15/01				FRI 02/16/01				SAT 02/17/01				SUN 02/18/01		
EST 6HRLY	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12
POP 12HR		30		40		40		30		20		20		40	60
MX/MN		35		46		34		41		24		33		18	30
TEMP	41	39	44	43	40	36	39	34	29	24	29	26	22	19	28
DEWPT	38	36	36	38	37	34	34	32	26	22	21	18	16	16	20
WIND DIR	SE	SE	S	S	SW	SW	SW	NW	NW	N	N	N	NE	SE	SE
WIND SPD	5	5	8	8	8	8	5	2	12	15	25	22	16	12	8
CLOUDS 6HR	BK	BK	OV	OV	BK	BK	BK	BK	SC	FW	FW	CL	CL	FW	SC
RAIN														C	C
RAIN SHWRS															L

## A. Standard Format

The Alphanumeric Forecast Matrix will follow the standard format shown in Exhibit 1. The RDF is composed of two blocks of forecasted weather parameters based on meteorologist's interaction with NWS gridded model data fields. The RDF is divided into two basic sections- a block of forecast parameters with a minimum 3-hourly (3HRLY) time interval, and 6HRLY block beneath it where the minimum time interval for any parameter is at least 6-hours. Three hourly weather parameters are confined to the first 60 hours, while 6 hour forecasts continue through Day 7.

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Standardized parameter descriptions are listed down the left edge of the product with a time line (LST) across the top. Unless otherwise noted, the parameter descriptions are listed in the order shown in Exhibit 1.

**1) Creation Software.** This product is created at NWS Weather Forecast Offices (WFOs) across most of the United States using the Advanced Weather Interactive Processing System (AWIPS) Graphical Forecast Editor (GFE) software. The software was developed by the NWS Meteorological Development Laboratory (MDL) located at NWS Headquarters.

**2) Mass News Disseminator (MND).** The MND header of the RDF contains the name of the product (Alphanumeric Forecast Matrix), the issuing office, and the date and time of issuance. \*If the RDF is created for a specific WFO defined location (point forecast), that location name will appear on the same line as the NWS Product Name (see below). The forecast shown in Exhibit 1 was issued on Monday, February 12, 2001. The issuance time was 4:00 a.m. Eastern Standard Time (EST).

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ALPHANUMERIC FORECAST MATRIX [for location]
NATIONAL WEATHER SERVICE CITY STATE
400 AM EST MON FEB 12 2001
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**3) Valid Time Event Code (VTEC).** The VTEC code is located immediately below the UGC and describes the content (what/where) of NWS watches, warnings, and advisories that are included at the point (or within the area) described by the RDF. In this example, "HW.A" indicates a High Wind Watch is in effect. The valid time of the watch is between 1900 and 2200 (2:00 PM EST - 5:00 PM EST) on 02/13/01.

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/NEW.CCCC.HW.A.####.0102T131900Z-0102T132200Z/
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**4) Issuance Time.** Although the RDF is routinely issued around 4:00 a.m. and 4:00 p.m. Local Time, it is a dynamic product. WFOs may issue event driven updates at any time—24 hours a day, 7 days a week, and 365 days a year.

**5) Valid Time.** The RDF is valid from the time of issuance until the next update or regularly scheduled issuance. Updates are event driven and may occur at any time. If there are no updates to the forecast, the RDF is valid for the 12-hour period from 4:00 a.m. to 4:00 p.m., or 4:00 p.m. to 4:00 a.m. the following morning.

**6) Expiration Time.** The RDF expiration time is set to 12- hours from time of issuance.

### **B. Content**

**1) Headline.** If long duration hazardous weather events have been forecast within the first 60 hours of the RDF, they will be headlined. Three dots will immediately precede and follow the headline. The headline may include watches, warnings, advisories or outlooks. More than one headline is possible, but all headlines will appear above the forecast time line.

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...HIGH WIND WATCH UNTIL 5 PM EST...

**2) Forecast Time Line.** Below the VTEC line (headline, if present), the forecast time line using the 24-hour clock is provided in 3 hour increments out to 60 hours (2 ½ days) into the future. Listed on the far left of this time line is the Local Time zone used in the RDF, along with a description of the highest resolution of the forecast parameters. In this example, the “EST 3HRLY” indicates that the time zone is Eastern Standard Time (EST), and the forecast parameters are separated into 3 hourly (or greater) time increments. Note that in the bottom segment of the RDF, there is another time labeled as “EST 6HRLY”. Once again, the time zone is EST, but the forecast parameters are in 6 hourly time steps, providing an extended forecast three to seven days into the future. Reference days are located above the corresponding 6:00 a.m. hour and are followed by the date.

	MON 02/12/01	TUE 02/13/01	WED 02/14/01
EST 3HRLY	03 06 09 12 15 18 21 00	03 06 09 12 15 18 21 00	03 06 09 12 15 18
	THU 02/15/01	FRI 02/16/01	SAT 02/17/01
EST 6HRLY	00 06 12 18 00	06 12 18 00	06 12 18 00

**3) Forecast Parameters.** The following RDF forecast parameters are listed in the order of appearance within the product. All elements are mandatory for a defined time period, except for “MAX QPF”, wind chill and/or heat index parameters. These optional parameters may be defined and added locally. In addition, precipitation elements are defined seasonally, and will only appear when precipitation is forecast. Outlook, Watch, Warning, and Advisory information will also only appear when forecast.

**a. POP 12HR** - Probability of Precipitation, is defined as the likelihood, expressed as a percent, of a measurable precipitation event (1/100th of an inch) at any given point within the area covered by the RDF. If the RDF is forecast for a single location, the POP 12HR represents the likelihood of measurable precipitation for a defined larger area surrounding that point. The “12HR” refers to the 12-hour valid time ending at 6:00 a.m. or 6:00 p.m. Local Time (0600 or 1800 Local Time). The POP 12HR value is right justified in the column beneath the hour defining the ending time of the valid period. In Exhibit 1, there is a 70% chance of precipitation during the 12-hour period between 6:00 p.m. EST Tuesday 02/13/01 and 6:00 a.m. EST 2/14/01. Also, from Exhibit 1, there is a 50% probability of precipitation between 6:00 a.m. EST and 6:00 p.m. EST on 2/14/01. *POP 12HR is forecast through Day 7.*

**b. QPF 12HR** - This parameter, quantitative precipitation forecast (QPF) represents the total amount of liquid precipitation, in inches, expected during a 12-hour period ending at 6:00 a.m., or 6:00 p.m. Local Time at any point in the forecast area. The QPF is presented in locally defined ranges, (e.g., .10-.24), or single values. The QPF 12HR value is right justified in the column beneath the hour defining the ending time of the expected precipitation. For example, in Exhibit 1, the QPF 12HR indicates that a total of .25-.49 inches of precipitation is expected sometime during the period beginning at 6:00 p.m. EST Tuesday 2/13/01 and ending by 6:00 a.m. EST Wednesday 2/14/01. *QPF 12HR is forecast out to 60 hours.*

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**c. MAX QPF** - A forecaster's subjective estimate (based on a 50% or higher confidence level) of the maximum amount of precipitation, in inches, that *may* occur at a given point within the forecast area during the 12-hour period ending at 6:00 a.m. or 6:00 p.m. Local Time. This amount is presented as a single value or in a range and can be identical to QPF 12HR in certain instances. MAX QPF is right justified below the hour defining the ending time of the expected precipitation, and is *available out to 60 hours*.

**d. SNOW 12HR** - The expected range of total snowfall accumulation (in whole inches) during a 12-hour period ending at 6:00 a.m. or 6:00 p.m. Local Time. SNOW 12HR will only appear during the locally defined winter period. This parameter is right justified in the column below the hour defining the time of the precipitation period, and is *available out to 36 hours*.

**e. MX/MN/RNG** - A forecast of maximum or minimum temperatures in degrees Fahrenheit (F) during the daytime or nighttime hours, respectively. "Daytime" is defined as 7:00 a.m. through 7:00 p.m. LST, and "Nighttime" is 7:00 p.m. through 8:00 a.m. LST. The 1 hour overlap was introduced to include minimum temperatures that occur just after sunrise. The overnight lows and daytime highs can be displayed as a single average number (e.g., 53). With the exception of RDF point forecasts, if lows or highs are expected to vary by several degrees, a range (RNG) may be provided. For example, in Exhibit 1 a minimum temperature of 36 to 39 degrees is forecast for a nighttime minimum on Monday 2/12/01. In RDF zone forecasts, the middle number within the range is the representative single digit value for that zone. *MX/MN/RNG is forecast out through Day 7.*

**f. TEMP** - The expected temperature at the specified time, in degrees F. The temperature is right justified in the column below the hour to which it refers. For example, in Exhibit 1 the forecasted temperature for 6:00 a.m. EST Wednesday 02/14/01 is 46 degrees F. *TEMP is forecast in 3-hour intervals through 60 hours, then 6-hour intervals through Day 7.*

**g. DEWPT** - The expected dewpoint temperature in degrees F is forecast for the same time periods as its corresponding forecast temperature. DEWPT is located directly below the corresponding temperature.

**h. RH 3HR** - The relative humidity is based on the average temperature and dewpoint during a 3 hour period. RH is located directly beneath DEWPT, but is valid for the 3-hour period ending at the hour indicated in the respective time column. For example, in Exhibit 1 the average RH between 12 noon and 3:00 p.m. (1200 to 1500 hours) on 02/13/01 is 74%. *RH is available in 3-hour increments through 60 hours.*

**i. WIND DIR** - The expected wind direction forecast to occur during the indicated hour, using the 8 points of a compass (e.g., W, NW, N . . . etc.). For example, in Exhibit 1 the forecasted prevailing wind direction, i.e., the direction from which the wind is blowing, at 9:00 a.m. EST Monday 02/12/01 is Northwest (NW). If a calm wind is forecast, dashes (- -) will be listed in place of a wind direction. WIND DIR is located below the hour to which it refers. *WIND DIR is available in 3-hour increments out to 60 hours, then 6-hour increments through Day 7.*

**j. WIND SPD** - The expected wind speed in miles per hour (MPH) forecast to occur

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during the indicated hour. For example, in Exhibit 1 the forecasted wind speed at 3:00 p.m. (1500 hours) EST Tuesday 02/13/01 is 36 MPH. If a calm wind is forecast, double zeros (00) will be listed in place of a wind speed. *WIND SPD is available in the same intervals as WIND DIR.*

**k. CLOUDS 3HR/6HR-** The expected 3-hour (or 6-hour) average of all clouds covering the sky during the period. CLOUDS is divided into five alphabetical category codes representing an equivalent percentage of sky cover. *The CLOUDS parameter is forecast in 3-hour increments out to 60 hours, then 6-hour increments through Day 7.* The complete RDF CLOUDS 3HR/6HR code list and equivalent sky cover definitions are as follows:

<b>CL - Clear.</b>	<b>Equivalent Percent Sky Cover: 0%</b>
<b>FW - Few Clouds.</b>	<b>Equivalent Percent Sky Cover: &gt; 0 and ≤ 25%</b>
<b>SC - Scattered Clouds.</b>	<b>Equivalent Percent Sky Cover: &gt;25% and ≤50%</b>
<b>BK - Broken Clouds.</b>	<b>Equivalent Percent Sky Cover: &gt;50% and ≤87%</b>
<b>OV - Overcast.</b>	<b>Equivalent Percent Sky Cover: &gt;87% and ≤ 100%</b>

**l. PRECIPITATION-** The RDF may list several types of precipitation. *Precipitation types are only shown in the RDF if they are forecast to occur at any point in the seven day forecast, and are listed in the far left column of the RDF underneath CLOUDS 3HR.*

For each type of precipitation forecast, a probability of precipitation is specified for 3-hour time periods out to 60 hours, then in 12-hour increments ending at 6:00 a.m. or 6:00 p.m. Local Time out to Day 7. The types of precipitation that may be forecast in the RDF are listed below.

<b>RAIN - Rain</b>	<b>SNOWSHWRS - Snow showers</b>
<b>RAIN SHWRS - Rain showers</b>	<b>FLURRIES - Flurries</b>
<b>TSTMS - Thunderstorms</b>	<b>SLEET - Sleet (ice pellets)</b>
<b>DRIZZLE - Drizzle</b>	<b>FRZNG RAIN - Freezing rain</b>
<b>SNOW- Snow</b>	<b>FRZNG DRZL - Freezing drizzle</b>

The probability codes and their associated definitions are as follows:

<b>S - Slight Chance (&lt; 20%)</b>	<b>L - Likely (60%-70%)</b>	<b>NM - Numerous (60%-70%)</b>
<b>IS - Isolated (&lt; 20%)</b>	<b>O - Occasional (80%-100%)</b>	
<b>C - Chance (30%-50%)</b>	<b>D - Definite (80%-100%)</b>	
<b>SC - Scattered (30%-50%)</b>	<b>WP - Widespread (80%-100%)</b>	

In Exhibit 1, RAIN is likely (indicated by an "L") during the period beginning at 12 midnight and ending at 9:00 a.m. EST WED 02/14/01. Thereafter, "C" represents a chance of rain from 9:00 a.m. until 12 noon on 02/14/01. In contrast, on Monday 2/12/01 no precipitation is forecast, so no probability codes are listed. *Precipitation categories are forecast in 3-hour intervals out to 60 hours, then 6-hour intervals out to Day 7.*

**m. OBVIS-** An obstruction to visibility. If an obstruction to visibility is forecast, a

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row labeled OBVIS will be listed underneath any forecast of precipitation. If no precipitation is forecast, then OBVIS will be listed under the row labeled CLOUDS. In the Exhibit 1 example, “K” implies that smoke is restricting visibility during the 6-hour period from 3:00 a.m. - 9:00 a.m. EST on Monday 2/12/01. *OBVIS is forecast in 3-hour intervals through 60 hours.* The complete RDF OBVIS code list and associated definitions are as follows:

<b>F - Fog</b>	<b>H - Haze</b>
<b>F - Patchy Fog</b>	<b>BS - Blowing Snow</b>
<b>F+ - Dense Fog</b>	<b>K - Smoke</b>
<b>PF+ - Patchy Dense Fog</b>	<b>BD - Blowing Dust</b>

**n. WIND CHILL and HEAT INDEX** - When the forecasted temperature is 50 degrees F or lower, and wind speed at least 4 mph, the Wind Chill Index line “WIND CHILL” may appear in the RDF. When the temperature is forecast to be 90 degrees F or higher, a row designated as, “HEAT INDEX” may be listed. *The Wind Chill and Heat Index are forecast out to 60 hours.*

**o. MIN CHILL 6HR and MAX HEAT 6HR** - When WIND CHILL or HEAT INDEX values appear in the RDF, a 6-hour minimum wind chill or maximum heat index may appear on the following row. These values indicate the minimum wind chill/maximum heat index that is forecast to occur during the 6-hour period ending at the time indicated at the top of the column. *MIN CHILL 6HR and MAX HEAT 6HR are forecast out to 60 hours.*

**p. OUTLOOK, WATCH, WARNING and ADVISORY** - Long duration hazardous weather events are included when a valid OUTLOOK, WATCH, WARNING and/or ADVISORY is issued by a WFO. The hazards are decoded into plain language from VTEC and will appear beneath any precipitation line(s). In the absence of precipitation, the line(s) are found below the CLOUDS category. Within the text of the RDF, the VTEC codes for OUTLOOK [O], WATCH [A], WARNING [W], and ADVISORY [Y] are applied to the 3-hour time spans in the RDF which most nearly correspond to the actual valid times of the event. That is to say, if the valid time falls within any portion of a particular 3-hour time window, the code will be applied to that entire time span. For example, in Exhibit 1, the “A” symbol indicates that a High Wind Watch is valid for at least a portion of the time between 12:00 noon - 6:00 p.m. EST on February 13. The actual event valid times are defined in the VTEC code line near the top of the product and described in the associated headline. In this example, the High Wind Watch official valid time extends from 1900 UTC-2200 UTC (2:00 p.m.-5:00 p.m. EST). *If forecast, these codes will only appear during the first 60 hours.*

### **C. Updates, Amendments, and Corrections**

Updates are event driven (may occur at any time) and based on the criteria established by the local WFO. When the RDF is updated, all forecast parameters prior to the update time are removed from the product. Occasionally, a forecast may need a correction. In these instances, the automated RDF product is replaced with the corrected version.